

REMARKS

Claims 1-17 are all the claims presently pending in the application. The specification and claims 1 and 3-4 are amended to more clearly define the invention and claims 5-17 are added. Claims 1, 3, and 9 are independent.

These amendments are made only to more particularly point out the invention for the Examiner and not for narrowing the scope of the claims or for any reason related to a statutory requirement for patentability.

Applicant also notes that, notwithstanding any claim amendments herein or later during prosecution, Applicant's intent is to encompass equivalents of all claim elements.

Claims 1-4 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the Message reference.

This rejection is respectfully traversed in the following discussion.

I. THE CLAIMED INVENTION

An exemplary embodiment of the claimed invention as defined by, for example, independent claim 1, is directed to a one-way clutch that includes a cage press fitted to an inner peripheral face of an outer race; a spring arranged along an inner diameter side of the cage and including pockets and annular portions comprising corrugated parts; and a sprag assembly including a plurality of sprags. The sprags are inserted into respective pockets of the spring and into the cage. At a position where a largest repulsive force is exerted from the cage to the spring, an overlapped portion is formed by one end portion of the spring overlapping the other end portion of the spring so that rigidity of the spring is increased. The overlapped portion of the spring is positioned by one of the corrugated parts at the one end

portion of the spring and an edge portion of the other end portion of the spring. The repulsive force exerted by the cage to the spring varies with respect to position.

Conventional one-way clutches often include a cage that has a somewhat elliptical shape before it is press fit into the outer race. Therefore, after the elliptically-shaped cage is press fit into the outer race, the outer race applies a force that varies with respect to position on the cage.

Other conventional one-way clutches may have a circular-shaped cage, that may become somewhat off-center after being press fit. Thus, again, the outer race applies a force that varies with respect to position on the cage.

Yet other conventional one-way clutches may include a cage and/or outer race that varies in size, due to a misalignment. Again, the outer race applies a force that varies with respect to position on the cage.

This varying force distorts the cage and the cage transmits a correspondingly varying force to the spring that is positioned against the inner peripheral surface of the cage.

The varying force being applied to the spring, causes the recovering force of the tongues of the spring to the sprags to correspondingly vary which, in turn, adversely affects the ability of the one-way clutch to synchronize the operation of the sprags to engage and/or disengage between the outer and inner races, and/or cause defective engagement of the sprags or even cause damage to the one-way clutch.

In stark contrast to the conventional one-way clutches, the present invention includes a spring that overlaps at a position where the cage exerts the largest force on the spring. In this manner, proper spring force can be maintained to ensure reliable synchronization across the sprags without any increase in cost (page 5, lines 6-14; page 9, lines 23-25, et. seq.).

II. THE 35 U.S.C. § 112, SECOND PARAGRAPH REJECTION

The Examiner alleges that claims 1-4 are indefinite. While Applicant submits that such would be clear to one of ordinary skill in the art taking the present Application as a whole, to speed prosecution claims 1, and 3-4 have been amended in accordance with Examiner Bonck's very helpful suggestions.

In view of the foregoing, the Examiner is respectfully requested to withdraw this rejection.

III. THE PRIOR ART REJECTION

The Examiner alleges that the Message reference teaches the claimed invention. Applicant submits, however, that there are elements of the claimed invention which are neither taught nor suggested by the Message reference.

In particular, the Message reference clearly does not teach or suggest the features of independent claims 1, 3, and 5 including a cage that exerts a force on the spring that varies with respect to position in combination with a spring that overlaps at a position where the cage exerts the largest force on the spring. As explained above, this feature is important for maintaining a proper spring force so that the operation of the sprags are synchronized without increasing the cost of the one-way clutch.

In stark contrast, as pointed out by Examiner Bonck, the one-way clutch that is disclosed by the Message reference includes a cage that "would appear to exert uniform repulsive force."

Indeed, the Message reference does not even recognize the problem that is solved by

the present invention.

The Message reference explains that “The dimension of the cage bore is in fact constant” (Col. 5, line 49) which, therefore, ensures that “better synchronization of all the cams is achieved as a result of the biasing action of the relatively rigid and homogenous assembly consisting of the cage and the spring.” (Col. 5, lines 57-60).

In other words, the Message reference does not even recognize the problem that is solved by the present invention where conventional one-way clutches include cages that, in fact, do not exert a “uniform repulsive force” which ensures “better synchronization of all of the cams as a result of the biasing action.”

In stark contrast, the inventor understood that conventional one-way clutches often do not have a cage that applies a uniform force to the spring. This causes the problem that the tongues of the spring do not apply a uniform force across all of the sprags. Therefore, the sprags do not synchronously engage and/or disengage between the inner and outer races.

The present invention solves this problem by providing a spring that overlaps at a position where the cage exerts the largest force on the spring.

Clearly, as admitted by the Examiner, the Message reference does not teach or suggest this feature.

Therefore, the Message reference does not teach or suggest each and every element of the claimed invention and the Examiner is respectfully requested to withdraw this rejection of claims 1-4.

IV. FORMAL MATTERS AND CONCLUSION

The Office Action objects to the drawings. This Amendment encloses replacement

drawing sheets which correct Figures 6-10 to include the legend "Prior Art." Applicant respectfully requests withdrawal of this objection.


In view of the foregoing amendments and remarks, Applicant respectfully submits that claims 1-17, all the claims presently pending in the Application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the Application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

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AMENDMENTS TO THE DRAWINGS:

The attached sheets of drawings include changes to Figs. 6-10. These sheets, which include Figs. 6-10, replaces the original sheets including Figs. 6-10. In Figures 6-10, a “Prior Art” legend has been added.

Attachments: Replacement Sheets

Annotated Sheets Showing Changes



6/10

FIG. 6 PRIOR ART

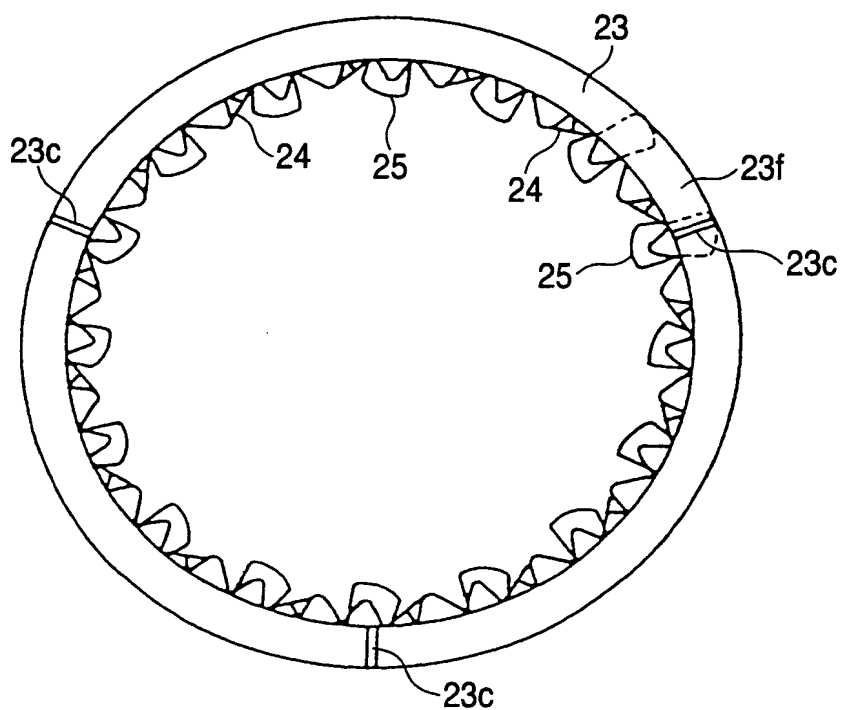


FIG. 8 PRIOR ART

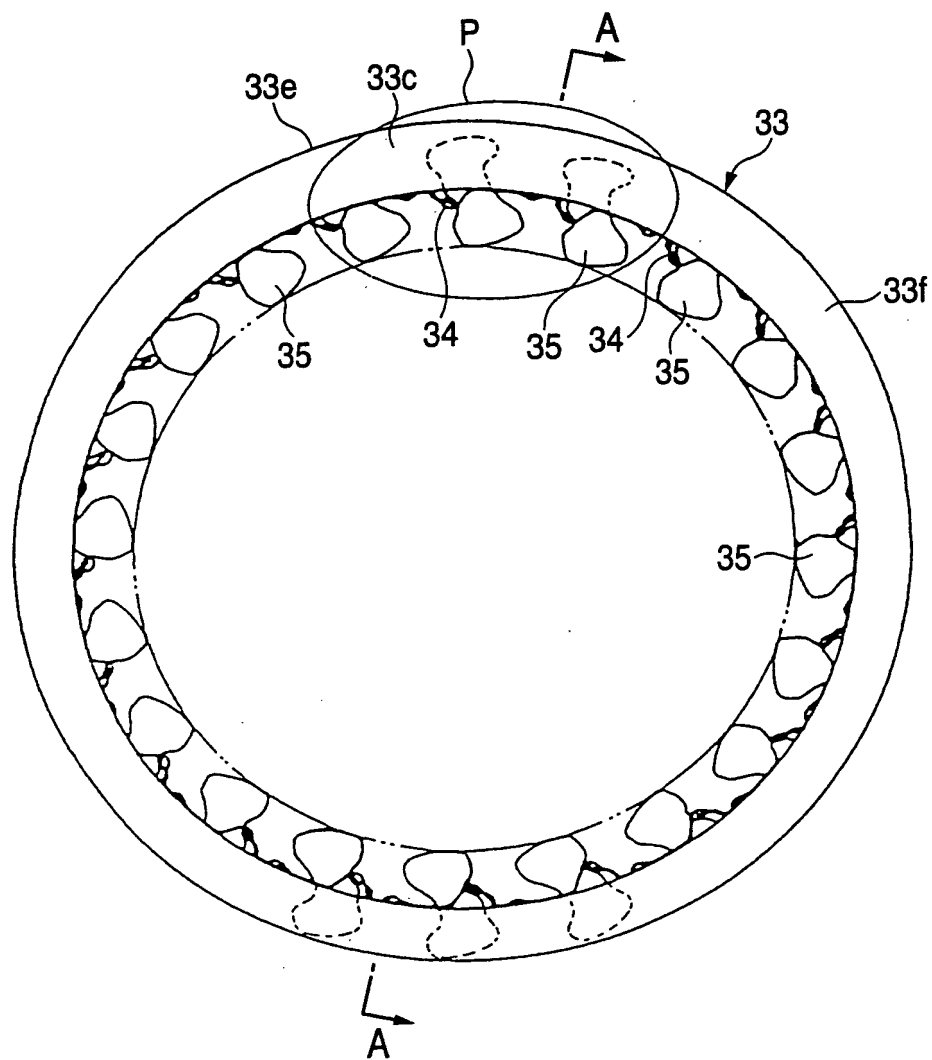


FIG. 9 PRIOR ART

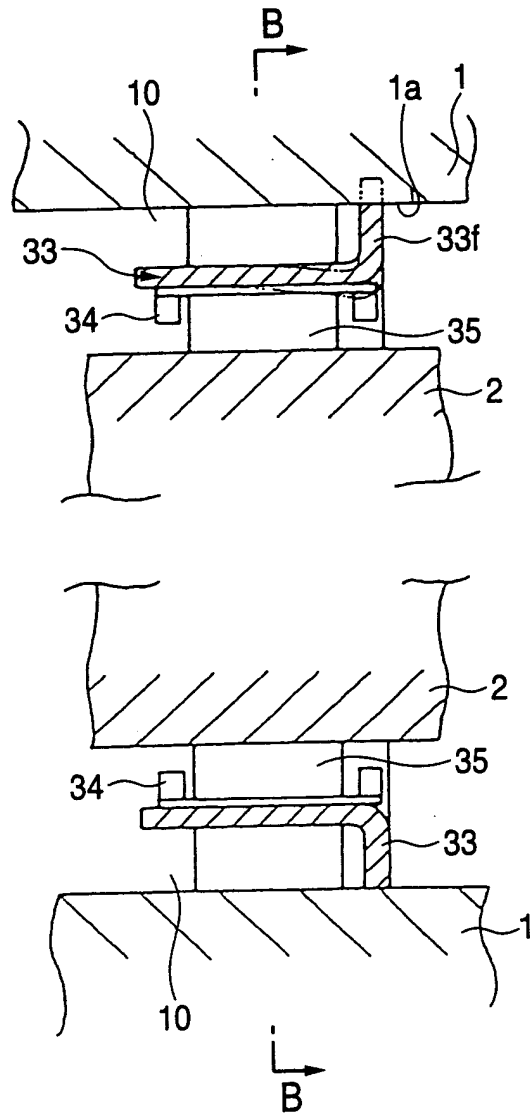


FIG. 10 PRIOR ART

